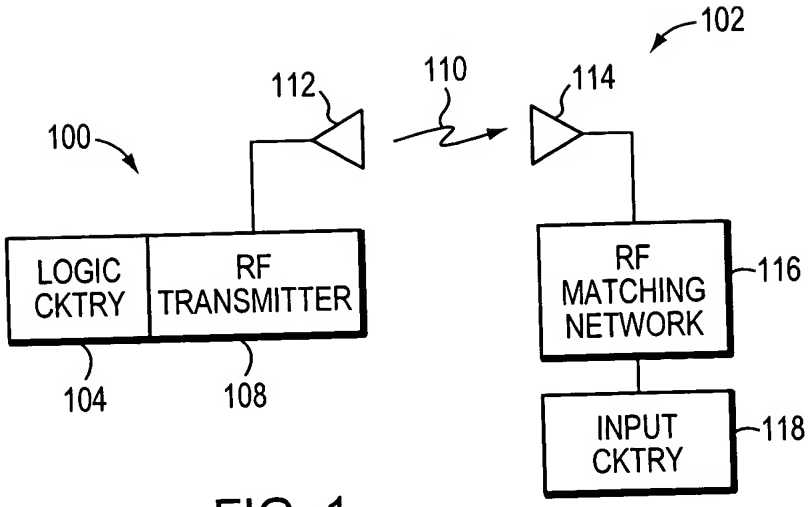
102
112
110
114
100
LOGIC CKTRY
RF TRANSMITTER
RF MATCHING NETWORK
116
104
108
INPUT CKTRY
118

FIG. 1

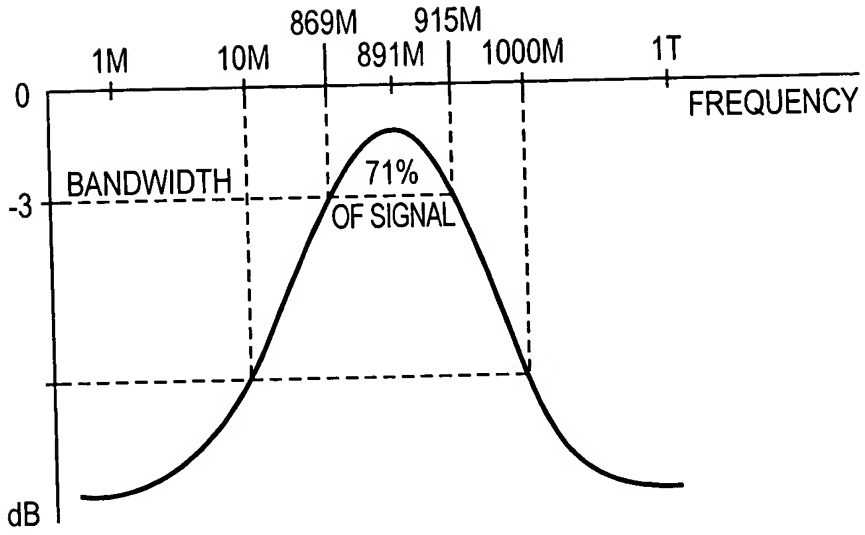
869M
915M
1M
10M
891M
1000M
1T
0
FREQUENCY
BANDWIDTH
71%
OF SIGNAL
-3
dB

FIG. 2

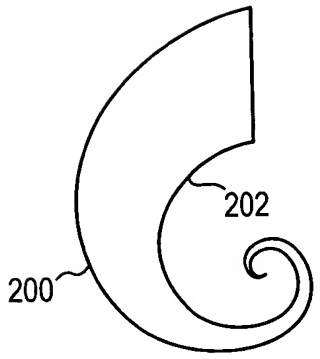

FIG. 3

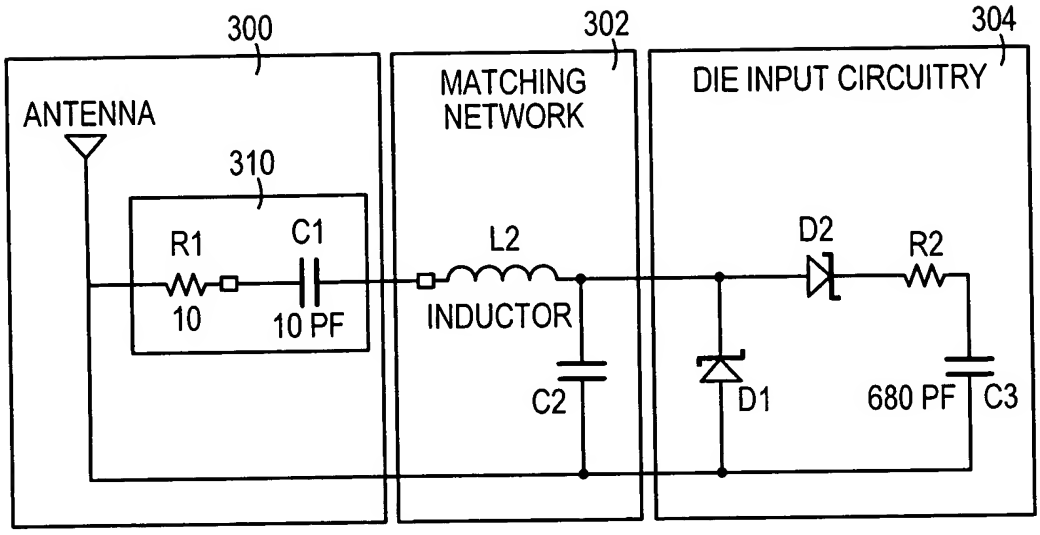
300
302
304
ANTENNA
MATCHING NETWORK
DIE INPUT CIRCUITRY
310
R1
C1
L2
D2
R2
10
10 PF
INDUCTOR
C2
D1
680 PF
C3

FIG. 4

OPERATING FREQUENCY: $F=915 \times 10^6$ Hz

ANTENNA INPUT IMPEDANCE: $Z_{in}=18$

DIE INPUT IMPEDANCE: $Z_{out}=3000$

QUALITY FACTOR: $Q=\sqrt{\left(\frac{Z_{out}}{Z_{in}}\right)-1}$

$Q=12.871$

TRANSFORMATION RATIO: $T_r=\sqrt{\frac{Z_{out}}{Z_{in}}}$

$T_r=12.91$

MATCHING NETWORK CALCULATIONS

SERIES INDUCTOR: $X1=Q \cdot Z_{in}$

$X1=231.681$

$L=\frac{X1}{(2 \cdot \pi \cdot F)}$

$\boxed{L=4.03 \times 10^{-8}}$ H

PARALLEL CAPACITOR: $X_c=\frac{Z_{out}}{Q}$

$X_c=233.079$

$C=\frac{1}{(2 \cdot \pi \cdot F \cdot X_c)}$

$\boxed{C=7.463 \times 10^{-13}}$ F

ANTENNA GAIN: G=5 dB

$A_v=10^{\frac{G}{10}}$

$A_v=3.162$

TRANSMITTER POWER: $P_t=1$ W

HALF WAVELENGTH W1 =0.439 feet

DISTANCE LAG FROM READER: d =5 feet

POWER AT RECEIVE ANTENNA

$POWER=\left[\frac{(2 \cdot W_1)}{(4 \cdot \pi \cdot d)}\right]^2 \cdot P_t \cdot A_v$

POWER $=6.175 \times 10^{-4}$ watts

VOLTAGE AT RECEIVE ANTENNA

$V_r=\sqrt{(Z_{in} \cdot Power)}$

$V_r=0.105$ volts

VOLTAGE USING TRANSFORMATION RATIO

$V_t=V_r\left(\sqrt{\frac{Z_{out}}{Z_{in}}}\right)$

$V_t=1.361$ volts

VOLTAGE AFTER VOLTAGE DOUBLER

$V_{in}=2.8 \cdot V_t-.6$

$\boxed{V_{in}=3.211}$ volts

FIG. 5

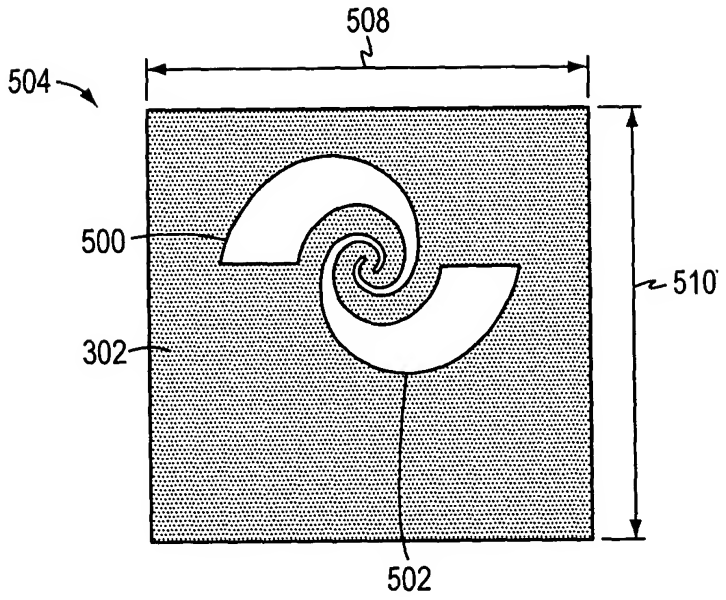

FIG. 6A

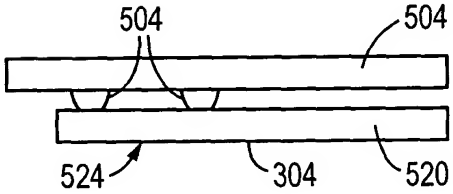

FIG. 6B